ORGANISATIONS AS LEARNING SYSTEMS – “Living composition” as an enabling infrastructure.

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Research and teaching:
Multinational and knowledge-intensive (service) organizations, complexity and knowledge management. Innovation milieus.

Earlier experience include, e.g.:
• Visiting researcher and Associate research professor at Copenhagen Business School, Denmark
• Long experience as a management consultant in international consulting firms
• Systems analyst and systems manager in private and public sectors
• Technology and development director at Seinäjoki Polytechnics, Finland.

- theoretical analysis concerning autopoiesis theory
- case study (four case firms)
- formulation of the Living Composition® model *)

*) Registered by CKC Creative Knowledge Consulting Ltd
AUTOPOIESIS, LEARNING AND RENEWAL

LIVING COMPOSITION
• sensing and memory
• components

EXAMPLES: CASE COMPANIES

PLATFORMS AND EVOLUTION MODELS

CONCLUSIONS AND IMPLICATIONS
Pressures: globalisation, competition, innovativeness, growth and profitability => How to:

• combine exploration and exploitation?
• design various organizational aspects?
• manage knowledge?
• implement ICT solutions?
• implement changes?
AN ORGANIZATION AS AN OPEN SYSTEM:
TRANSFORMS SOMETHING INTO SOMETHING ELSE

(1) ENVIRONMENT

Input

An organization

Transformation process

Output
(2) AN ORGANIZATION AS AN AUTOPOIETIC SYSTEM:
TRANSFORMS ITSELF INTO ITSELF. LEARNS, AND RENEWS ITSELF. SELF-PRODUCTION.

'ENVIRONMENT'

An organization
'LIVING COMPOSITION', APPLICATION OF AUTOPOIESIS THEORY

'SENSING'

'SESENSEN'

'ENVIRONMENT'

An organization

'MEMORY'

'OPEN'
- Interactive openness
- Sensing
- Access to new knowledge
- Coordination with the environment

and

'CLOSED'
- Self-referentiality
- Memory
- Access to existing knowledge
- Maintains the functioning
<table>
<thead>
<tr>
<th><strong>FEEDBACK</strong></th>
<th>Feedback-loop via the external environment, 'open feedback'</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internal closure, self-referentiality</td>
<td></td>
</tr>
</tbody>
</table>

**Boundary**

<table>
<thead>
<tr>
<th><strong>OPEN</strong> SYSTEM (DOUBLE-OPEN)</th>
<th><strong>CLOSED</strong> SYSTEM (CLOSED AND OPEN)</th>
</tr>
</thead>
<tbody>
<tr>
<td>OPEN: open boundary.</td>
<td>CLOSED: internal closure.</td>
</tr>
<tr>
<td>CLOSED: internal closure.</td>
<td>CLOSED: closed boundary</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>CONNECTED SYSTEM</strong> (OPEN AND CLOSED)</th>
<th><strong>PASSIVE SYSTEM</strong> (CLOSED AND OPEN)</th>
</tr>
</thead>
<tbody>
<tr>
<td>OPEN: open boundary.</td>
<td>CLOSED: closed boundary</td>
</tr>
<tr>
<td>OPEN: 'open feedback' via the environment.</td>
<td>CLOSED: internal closure.</td>
</tr>
<tr>
<td>CLOSED: internal closure.</td>
<td>OPEN: 'open feedback' via the environment (but no effect)</td>
</tr>
</tbody>
</table>

Boundary and feedback: four resulting system alternatives.
<table>
<thead>
<tr>
<th>LEVEL</th>
<th>DESCRIPTION</th>
<th>CHARACTERISTIC</th>
<th>TYPE OF RELATIONS</th>
<th>EXAMPLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Structures and frameworks</td>
<td>Static, spatial patterns</td>
<td><strong>Topology</strong> (where)</td>
<td>Bridge, mountain, table, crystal</td>
</tr>
<tr>
<td>2</td>
<td>Single mechanistic systems</td>
<td>Dynamic, pre-determined changes, processes</td>
<td><strong>Order</strong> (when)</td>
<td>Solar system, clock, tune, computer</td>
</tr>
<tr>
<td>3</td>
<td>Control mechanisms, cybernetic systems</td>
<td>Error-controlled feedback, information</td>
<td><strong>Specification</strong> (what)</td>
<td>Thermostat, body temperature system, auto-catalytic system</td>
</tr>
<tr>
<td>4</td>
<td>Living systems</td>
<td>Continuous self-production</td>
<td><strong>Autopoietic relations</strong> (First-order autopoiesis)</td>
<td>Cell, amoeba, single-celled bacteria</td>
</tr>
<tr>
<td>5</td>
<td>Multicellular system</td>
<td>Functional differentiation</td>
<td><strong>Structural coupling</strong> between cells (Second-order autopoiesis)</td>
<td>Plants, fungi, moulds, algae</td>
</tr>
<tr>
<td>6</td>
<td>Organisms with nervous systems</td>
<td>Interaction with relations</td>
<td><strong>Symbolic, abstract relations</strong></td>
<td>Most animals (except, e.g., sponges)</td>
</tr>
<tr>
<td>7</td>
<td>Observing systems</td>
<td>Language, self-consciousness</td>
<td>Recursive, self-referential relations</td>
<td>Humans</td>
</tr>
<tr>
<td>8</td>
<td>Social systems</td>
<td>Rules, meanings, norms, power</td>
<td><strong>Structural coupling</strong> between organisms (Third-order autopoiesis)</td>
<td>Families, organizations</td>
</tr>
<tr>
<td>9</td>
<td>Transcendental systems</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

'SIX-POINT KEY'

'Six-point key' defines the requirements for an autopoietic system:

**General criteria:**

1. The system is a unity with identifiable boundaries.  
2. The system can be decomposed into components in order to be analyzable as a ‘whole’.  
3. The component properties are capable of satisfying certain relations that determine in the system the interactions and transformations of these components.

**Specific criteria:**

4. The system is contained within and produces a boundary.  
5. The system is maintained by the interactions of its components.  
6. The system’s modus operandi is a dynamic network of interacting processes of autopoietic ‘production’.
<table>
<thead>
<tr>
<th>CHARACTERISTIC</th>
<th>DEFINITION (The term ‘system’ has been replaced by ‘organization’)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Autopoiesis (self-production)</td>
<td>An organization produces its own components and boundaries and renews itself in a way that allows the continuous maintenance of its integrity.</td>
</tr>
</tbody>
</table>
| Identity                         | 1. Being composed of components and their relationships.  
2. Being distinguishable from other unities (e.g., from other organizations).                                                                                                                                                                     |
| Components                       | Non-physical parts of the system that are continually produced by the organization.                                                                                                                                                                                      |
| Boundaries                       | Non-physical parts of the system that connect the system to its environment through reciprocal interaction. Here: Boundary elements. (roles and functions).                                                                                                                      |
| Triggers                         | Signals that are treated as perturbations, not as an input to the organization.                                                                                                                                                                                        |
| Structural coupling              | Reciprocal interaction (mutual relationship or correspondence) with the environment. History of recurrent interactions leading to the structural congruence.                                                                                                               |
| Interactive openness             | The organization interacts with the environment and compensates the perturbations by improving knowledge (distinctions) and changing its ‘structure’.                                                                                                              |
| ‘Organizational closure’ (‘Operational closure’) | Any change in the organization is a structural change. The product of the transformation is the very organization itself.                                                                                                                                 |
| Self-referentiality              | 1. Accumulated knowledge affects the structure and operation of the organization.  
2. The organization affects the (creation of) new knowledge.                                                                                                                                                                |
| Social coupling                  | Reciprocal interaction (communication) by using language.                                                                                                                                                                                                             |

Basic characteristics of a self-producing (autopoietic) system. (Based on Maturana and Varela, 1980, 1987; Mingers, 1995, 1997; von Krogh and Roos, 1995; non Krogh et al., 1996a).
AUTOPOIESIS, LEARNING AND RENEWAL

LIVING COMPOSITION

• sensing and memory
• components

EXAMPLES: CASE COMPANIES

PLATFORMS AND EVOLUTION MODELS

CONCLUSIONS AND IMPLICATIONS
Sensing and memory - The two major knowledge flows of a living organization.

**SENSING (INTERACTIVE OPENNESS)**
*Enabled by boundary elements.*
- Helps to acquire, create, and improve knowledge through:
  1. Responding to triggers.
  2. Interacting with environment.
  3. Conducting experiments.
- Coordinates the organization with environment.
- Validates learning and renewal processes.

**MEMORY (SELF-REFERENTIALITY, ORGANIZATIONAL CLOSURE)**
*Enabled by internal structure (living composition).*
- Provides access to existing, accumulated knowledge.
- Maintains the organization’s functioning.
- Improves efficiency.
‘SENSING’ (interactive openness)

- Sensitivity to triggers (weak signals, etc.)
- Interaction, communication
- Experimentation

‘ENVIRONMENT’

Boundary elements, (roles and functions, including organizational and ICT solutions)
MEMORY (self-referentiality, access to existing knowledge)
Embedded in several aspects of the organization
AUTOPOIESIS, LEARNING AND RENEWAL

LIVING COMPOSITION
  • sensing and memory
  • components

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PLATFORMS AND EVOLUTION MODELS

CONCLUSIONS AND IMPLICATIONS
Living composition of an organization: Ten strategic non-physical components and two major knowledge flows.
ORGANIZATIONAL LEARNING AND RENEWAL

LIVING COMPOSITION
STRATEGIC COMPONENTS AND THEIR RELATIONSHIPS.
TWO MAJOR KNOWLEDGE FLOWS.
Has implications for organizational learning and renewal capability.

CONSISTENCY OF THE LIVING COMPOSITION
Characterizes the living composition.

The consistency of living composition influences organizational learning and renewal.
AUTOPOIESIS, LEARNING AND RENEWAL

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CONCLUSIONS AND IMPLICATIONS
ERNST & YOUNG
MANAGEMENT CONSULTING
ERNST & YOUNG (MANAGEMENT CONSULTING)

Big multinational (1989 / merger).
660 offices (incl. auditing) in 173 countries.
72,000 employees.
Methodology driven consulting.
A ’learning organization’.
Extensive knowledge sharing and knowledge management system.
Ernst & Young Knowledge Process Landscape Model.
ERNST & YOUNG (MANAGEMENT CONSULTING)
Boundary elements, e.g.:
  • Consultants
  • Ernie ’virtual consultant’
  • Centers for Business Knowledge
  • EY Knowledge Services Group
  • ’Cybrarians’
  • Knowledge officers/managers/stewards/coordinators etc.

EY Infolink, scanning of external information
Accumulation of knowledge in 150 Power Packs and 470 knowledge bases
The strategic components of Ernst & Young (Management Consulting).

**IDENTITY**
A large and global company. Member firms, local ownership. 4 practices. Account centric: value for the client. An information technology and methodology oriented company. A knowledge sharing culture.

**STRATEGY**
Merger (1989), rapid growth, and expansion in emerging markets. Global State /02 plan. Large scale transformation implemented. Knowledge is one of five megaprocesses. Thought leadership.

**INTERNAL STANDARDS, PROCESSES, AND COMMUNICATION**

**KNOWLEDGE**
Intellectual capital. Personal knowledge is connected with globally accumulated and packaged organizational knowledge. Extensive knowledge management. Knowledge Process Landscape model.

**PERCEPTION OF THE ENVIRONMENT**
- Increasingly rapid changes and discontinuities in the market.
- Knowledge is the most important success factor.

**TRIGGERS. Sources:**
- Client assignments.
- Global centers monitor trends.
- EY/KWeb scans information 24 hours a day.
- New external databases are monitored continuously.

**IDENTITY**
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**INTERNAL STANDARDS, PROCESSES, AND COMMUNICATION**

**KNOWLEDGE**
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**INFORMATION AND COMMUNICATION SYSTEMS**
Knowledge and technology investments: 6 % of annual revenues. IT supports ‘disconnected’ and ‘connected’ use. EY/KnowledgeWeb (Lotus Notes, Intranet, Internet). EY/InfoLink. PowerPacks. Global + local knowledge bases.

**EXPERIMENTATION**
- Delegated to global centers.
- Normally: standard methodology. Knowledge reduces need for experimentation in some industries.
- Management supports experimentation.

**GLOBAL ENVIRONMENT**
Client assignments.
- Methodology support.
- Documentation.
- Global Client Consulting Groups. Knowledge Based Business services. Electronic client services:
  - ErnieSM, EYT StoreFront.

**BOUNDARY ELEMENTS**
- Create knowledge and experiences.
- Identify and capture knowledge, convert it to explicit form.
- Search, acquire, and convey new information.
- Structure, pack, and store knowledge.
- Support finding knowledge.
- Influence the environment.
- Provide a technical platform (cyberspace) for knowledge sharing and access.
PERCEPTION OF THE ENVIRONMENT
Motivates interactive openness and sharing of knowledge.

TRIGGERS
Active monitoring, and global exposure to triggers (e.g., EY/KWeb, mergers) improves distinctions.

INTERACTIVE PROCESSES AND COMMUNICATION
Interaction with clients and other parties improves distinctions and congruence with the global environment.

EXPERIMENTATION
Improves distinctions.

IDENTITY
Identity emphasizes learning and motivates interactive openness and self-referentiality.

Learning and evolution reinforce the identity. Influenced by mergers.

STRATEGY
Strategy emphasizes change and clear internal structures.

Knowledge helps to obtain strategic objectives of growth and thought leadership, and to implement new ones.

KNOWLEDGE (Distinctions)
Knowledge accumulation:
- Knowledge Process Landscape Model.
- Subject Matter Expert SME Networks.

INTERNAL PROCESSES, STRUCTURES, AND COMMUNICATION
‘Memory’ provides access to knowledge. Global sharing and reuse increase the value of intellectual capital, facilitate learning from experience, and increase value for client.

‘Sensing’ improves congruence with the environment.
- improves distinctions (knowledge).
- helps to validate the learning and evolution system.

BOUNDARY ELEMENTS

Ernst & Young (Management Consulting) as a living composition.
The KaosPilots and KaosManagement
The KaosPilots and KaosManagement

A small value-chain:
- KaosManagement: consulting (1993-)

Offices in Denmark, USA, South Africa

13 employees, and an extensive network of various kinds of partners

Specialists in ’navigating in chaos’

Innovative consulting, education and project work.

A unique institutionalized platform for experiments

Market-oriented

Contributors to Scandinavian leadership model
The KaosPilots’ networks, specified

- 'Kaospilots’ (students)
- 'Less-profit’ projects
- Cultural and youth organizations
- Other influential people
- Freelance teachers
- Freelance consultants
- Company Club (CEO’s)
- Mediapeople ’MTV/MBA’
The KaosPilots and KaosManagement

Scanning of trends and tendencies, ’closer to MTV than MBA’

Experimentation, intuition, special competence structure

Chaordic organization; learning by acting

Boundary elements, e.g.:
- Kaospilots (students)
- Freelancers (consultants, teachers)
- Company Club
- Other extensive and influential networks
The strategic components of The KaosPilots and KaosManagement.
The KaosPilots and KaosManagement as a living composition.
ARTHUR D. LITTLE (EUROPE)
ARTHUR D. LITTLE (EUROPE)

Big multinational.
Founded in 1886. ’Oldest consulting firm in the world’.
52 offices in 30 countries. Over 3000 employees (the whole company).
Expert (and methodology) driven consulting.
Implementing stage (during the interviews of the study)
  • Organizational transformation
  • Knowledge sharing system
Innovations side-by-side with the clients
Accumulation of expertise in the specialists
KEY DIFFERENTIATOR: Proportion between senior and junior people.

Time

PYRAMID ORGANIZATION (many consulting firms)

Difficult for new people to enter into a top position.

No space for all the juniors to go up in the organization - they have to leave.

Growth

CYLINDER (RECTANGULAR) ORGANIZATION (Arthur D. Little)

Experienced people can enter into top positions.

Space to go up in the organization.

Growth

Some people leave.

Career opportunities in pyramid and cylinder organizations (Source: Arthur D. Little).
The strategic components of Arthur D. Little (Europe).
AUTOPOIESIS, LEARNING AND RENEWAL

LIVING COMPOSITION
• sensing and memory
• components

EXAMPLES: CASE COMPANIES

PLATFORMS AND EVOLUTION MODELS

CONCLUSIONS AND IMPLICATIONS
<table>
<thead>
<tr>
<th>Consistency of the Living Composition</th>
<th>Intended</th>
<th>Unintended</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consistent</td>
<td>INTENTIONAL FIT</td>
<td>EMERGENT FIT</td>
</tr>
<tr>
<td>Intended</td>
<td>A tailored and consistent composition that connects interactive openness and self-referentiality. It facilitates company-wide learning and renewal.</td>
<td>Incidental changes, experiments, or action-oriented evolution, with a consistent outcome.</td>
</tr>
<tr>
<td>Inconsistent</td>
<td>STRETCH</td>
<td>MISFIT</td>
</tr>
<tr>
<td>Intended</td>
<td>A planned and controlled transformation or change, or a sequence of them. Temporarily inconsistent.</td>
<td>Incidental changes, experiments, or action-oriented evolution, with an inconsistent outcome.</td>
</tr>
</tbody>
</table>

The four **consistency/intentionality platforms** concerning the living composition.
### Consistency/Intentionality Platforms

The compositions of the case organizations.

<table>
<thead>
<tr>
<th>Consistency/Intentionality Platforms</th>
<th>Consistent</th>
<th>Intended</th>
<th>Unintended</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>INTENTIONAL FIT</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Arthur Andersen (Business Consulting)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ernst &amp; Young (Management Consulting)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Arthur D. Little (Europe)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(improves the intentional fit composition)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>EMERGENT FIT</strong></td>
<td></td>
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<tr>
<td>KaosPilots and KaosManagement</td>
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<td><strong>STRETCH</strong></td>
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<td></td>
</tr>
<tr>
<td>Arthur D. Little (Europe)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(the temporary transformation process)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>MISFIT</strong></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>
The evolution models concerning the living composition.

- **Sensing** is utilized
  - 1a. SYSTEMATICALLY EXPLORING AND ACCUMULATING ORGANIZATION
  - 1b. ORIGINAL, INNOVATIVE ORGANIZATION
- **Sensing** is not utilized
  - 2. EXPLORING AND ADAPTING ORGANIZATION (‘ad hoc’)
  - 3. ISOLATED ORGANIZATION
  - 4. PASSIVE ORGANIZATION

- **‘MEMORY’, SELF-REFERENTIALITY**
  Accessing earlier experiences and knowledge, and learning from them.

- **‘SENSING’, INTERACTIVE OPENNESS**
  Interaction and co-evolution with the environment.
AUTOPOIESIS, LEARNING AND RENEWAL

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CONCLUSIONS AND IMPLICATIONS
THE LIVING COMPOSITION FACILITATES CREATIVITY AND EFFICIENCY. AN ATTEMPT TO SOLVE THE CLASSIC DILEMMA.

(1) New knowledge through boundary elements. Exploration of the external environment and co-evolution with it.

(2) Order AND new knowledge through access to memory and continuous maintenance of the strategic components (internal structure = living composition).

(3) Internal self-organization in communities, networks etc.: facilitates creativity and creates new knowledge and capabilities.
<table>
<thead>
<tr>
<th></th>
<th><strong>PROACTIVE INTERPRETATION</strong></th>
<th><strong>PASSIVE INTERPRETATION</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>BOUNDARY</strong></td>
<td>Connects an organization to its environment through reciprocal interaction.</td>
<td>Separates an organization from its environment.</td>
</tr>
<tr>
<td><strong>RELATIONSHIP TO THE ENVIRONMENT</strong></td>
<td>Interactively open towards the environment. An organization learns and renews itself through experimentation, reciprocal Interaction, and exposure to triggers from the environment. It selects autonomously whether to change or not.</td>
<td>Closed (isolated) towards the environment. An organization cannot change itself, and the environment cannot directly instruct the organization.</td>
</tr>
<tr>
<td><strong>KNOWLEDGE AND SELF-REFERENTIALITY</strong></td>
<td>Enable learning from earlier experience.</td>
<td>Limit learning.</td>
</tr>
<tr>
<td><strong>INTERNAL ‘STRUCTURE’ (LIVING COMPOSITION)</strong></td>
<td>Provides an enabling infrastructure for learning and continuous renewal.</td>
<td>Is a source of rigidity.</td>
</tr>
</tbody>
</table>

Proactive and passive interpretation of living organizations.
DIVERSITY OF LIVING SYSTEMS: DIFFERENCES IN COMPOSITION, SENSING, MEMORY, KNOWLEDGE FLOWS. The same applies for organizations.
THE PROCESS OF IMPROVING AN ORGANIZATION’S LIVING COMPOSITION

STEP 1: CREATE AWARENESS AND COMMUNICATE THE NEED FOR CHANGE
  • Create shared awareness of the principles of living organizations.
  • Identify the current position of the organization on the consistency/intentionality platform and evolution model.
  • Describe preliminary strengths, problems, development needs, and objectives.

STEP 2: ANALYZE THE STRATEGIC COMPONENTS

STEP 3: ANALYZE THE KNOWLEDGE FLOWS AND KNOWLEDGE PROCESSES
  • two major knowledge flows: (1) Sensing, (2) Memory
  • four knowledge processes: (1) Highly-structured explicit/digital knowledge, (2) Less-structured explicit/digital knowledge, (3) Highly-structured tacit knowledge, (4) Less-structured tacit knowledge.

STEP 4: DESCRIBE THE CURRENT LIVING COMPOSITION OF THE ORGANIZATION AND ANALYZE ITS DYNAMICS

STEP 5: DESIGN AND IMPLEMENT THE IMPROVED OR NEW LIVING COMPOSITION

STEP 6: UTILIZE, MEASURE, AND IMPROVE THE LIVING COMPOSITION
'Living composition' model attempts to be a theoretically justified and structured interpretation of autopoiesis theory in the organizational context.

- identification of **internal structure** and **components**
- identification of **boundaries**
- new, **proactive** interpretation of **openness and closure**
- interpretation of organizational **complexity** in terms of **enabling infrastructure** and continual, dynamic changes (and not only chaos).
- identification of the **diversity** of firms (platforms)
- identification of the importance of **intentionality and consistency** in organizational design and evolution
'Living composition' model serves as a good tool for teaching

Example 1: The university students have analyzed in teams about 25 firms representing various industries. Their work is based on:
• two lectures
• analysis of 2-4 cases about a firm as 'living composition'.
• introductory information to the managers
• relatively short interviews of managers in teams.

The results are very good and indicate that the students can create a good picture of the firm and identify needs for further development.

Example 2: Based on about 3-4 hours’ lecture and some written material, about 40 MBA-students have analyzed their employer firms. The results are mainly very good, and indicate that the students can better understand the structure and functioning of their firm.
'Living composition' model serves as a good tool for organizing research.

Example: Together with other models and concepts, it helps to identify objects for research so that they constitute a larger picture of the functioning of firms.
New shared framework for managers, consultants and the whole organization.

'Living composition' model helps to:

• analyze and understand an organization’s enabling organizational infrastructure in a structured way in private and public sectors
• understand the differences between organizations, and to compare them with each other.
• cope with size, growth and technological level
• identify and prioritize development needs
• develop managerial and consulting skills.
CONTACT INFORMATION

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